NEW SPECIES OF *GEISSANTHUS* (MYRSINACEAE) FROM THE HYLAEA/ANDEAN INTERFACE OF ECUADOR AND PERU

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ABSTRACT

Routine determination of specimens received as gift for determination resulted in the discovery of three novelties in *Geissanthus*. *Geissanthus vanderwerffii* Pipoly, *G. spectabilis* Pipoly and *G. challuayacus* Pipoly are described, illustrated and their phylogenetic relationships are discussed.

RESUMEN

Al determinar muestras recibidas como regalos para su determinación, se encontraron tres especies nuevas, pertenecientes al género *Geissanthus*. Se describe, se ilustra y se discute el parentesco de *Geissanthus vanderwerffii* Pipoly, *G. spectabilis* Pipoly y *G. challuayacus* Pipoly.

INTRODUCTION

The genus *Geissanthus* was circumscribed by Hooker (Bentham & Hooker 1876) to include 10 taxa from the Andes, which he did not list. The only reference to a taxon was made indirectly, by listing *Fendler 759*, a specimen of *Geissanthus fragrans* Mez. Mez (1902) distinguished *Geissanthus* from the other genera of the tribe Myrsineae by its free stamens, dorsifixed anthers, and the calyx closed in bud, opening later into irregular lobes. In that treatment, 25 species were recognized, of which 17 were new. We must assume, therefore, that at least eight of the taxa described as new by Mez had actually been seen previously by Bentham, but remained undescribed. Subsequently, miscellaneous new species were added to the genus by Mez (1905, 1920), MacBride (1934) and Cuatrecasas (1951).

Agostini (1970) was the first worker since Mez to discuss generic delimitation among taxa assigned to *Conomorpha* A. DC., and *Stylogyne* A. DC. Agostini distinguished *Geissanthus* from *Stylogyne* and what was at that time the *Cybianthus* Martius complex of genera (including *Conomorpha* A. DC., *Weigeltia* A. DC., *Comomyrsine* Hooker) based on a combination of several characters, including: the terminal inflorescence; sessile or subsessile flowers; calyx lobes closed in bud, then rupturing into 2–8 unequal lobes

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on the same inflorescence; corolla lobes fused 1/3 or more of their length; and a capitate stigma. Using those criteria, he transferred three taxa from *Conomorpha,* and one taxon from *Stylogyne,* to *Geissanthus*.

My previous studies (Pipoly 1993) and the present one reconfirm that *Geissanthus* may best be defined by its unique calyx, closed in bud and opening into 2–8 usually unequal lobes, the corolla with linear, oblong or rarely ovate lobes that are distally recurved at least 180° in anthesis, and the subversatile or versatile anthers which are latrorsely dehiscent by wide or narrow longitudinal slits. *Stylogyne* may easily be separated from *Geissanthus* by its contorted corolla, with the lobe tips highly twisted in bud. *Cybianthus* (including *Comomyrsine* Hooker, *Conomorpha* A.DC., *Correlliana* D'Arcy, *Grammadenia* Bentham, *Microconomorpha* (Mez) Lundell, and *Weigeltia* A. DC., see Pipoly 1987, 1992) may be separated from *Geissanthus* by its axillary inflorescences, stamens connate by their filaments to form a tube, the staminal tube adnate to the corolla tube, and the glandular granules present at least at the junction of the corolla lobes and tube. Using these criteria to determine generic limits, Pipoly (1993) transferred three species into *Geissanthus* and described an additional four species. Those seven taxa, and the three novelties described here, bring the total number of species recognized in *Geissanthus* to 45. Because I disagree with the placement of *Stylogyne ambigua* (Martius) Mez in *Geissanthus* (Agostini 1970), the genus is entirely Andean except for populations of *Geissanthus perpuncticulosus* (Lundell) Pipoly occurring in the Darién of Panama. Members of the genus are mostly known from moist, wet and pluvial premontane, montane, and cloud forests, and less frequently from subpáramo thicket formations. They are moderate trees, usually less than 15 m tall, with very conspicuous terminal, paniculate inflorescences. Quantitative studies of Andean forests I have conducted in Colombia indicate that they generally occur in populations smaller than 20 individuals per hectare, at least in the mid-level stratum of the montane and cloud forests. My qualitative observations from Ecuador and Peru have thus far confirmed the statistics observed in Colombia.

Determination of gift specimens received from the Missouri Botanical Garden, in connection with their floristic studies in Ecuador and Peru, resulted in the discovery of the following novelties, described herewith. Morphological terminology follows Pipoly (1993) and Lindley (1848).

Geissanthus vanderwerffii Pipoly, sp. nov. (Fig. 1)

Quoad ramulos angulatos glabrosque, folia alterna, petiolos marginatos, lamina secus margines integerrima, inflorescentiam folias longitudine aequantiam vel subaequantiam, corollam campanulatam, necnon lobos corollinos retrocurvatos, *G. ecuadorensi* valde arcte affinis, sed ab ea laminis coriaceis (non cartilagineis) desuper scrobiculatis (nec laevibus)

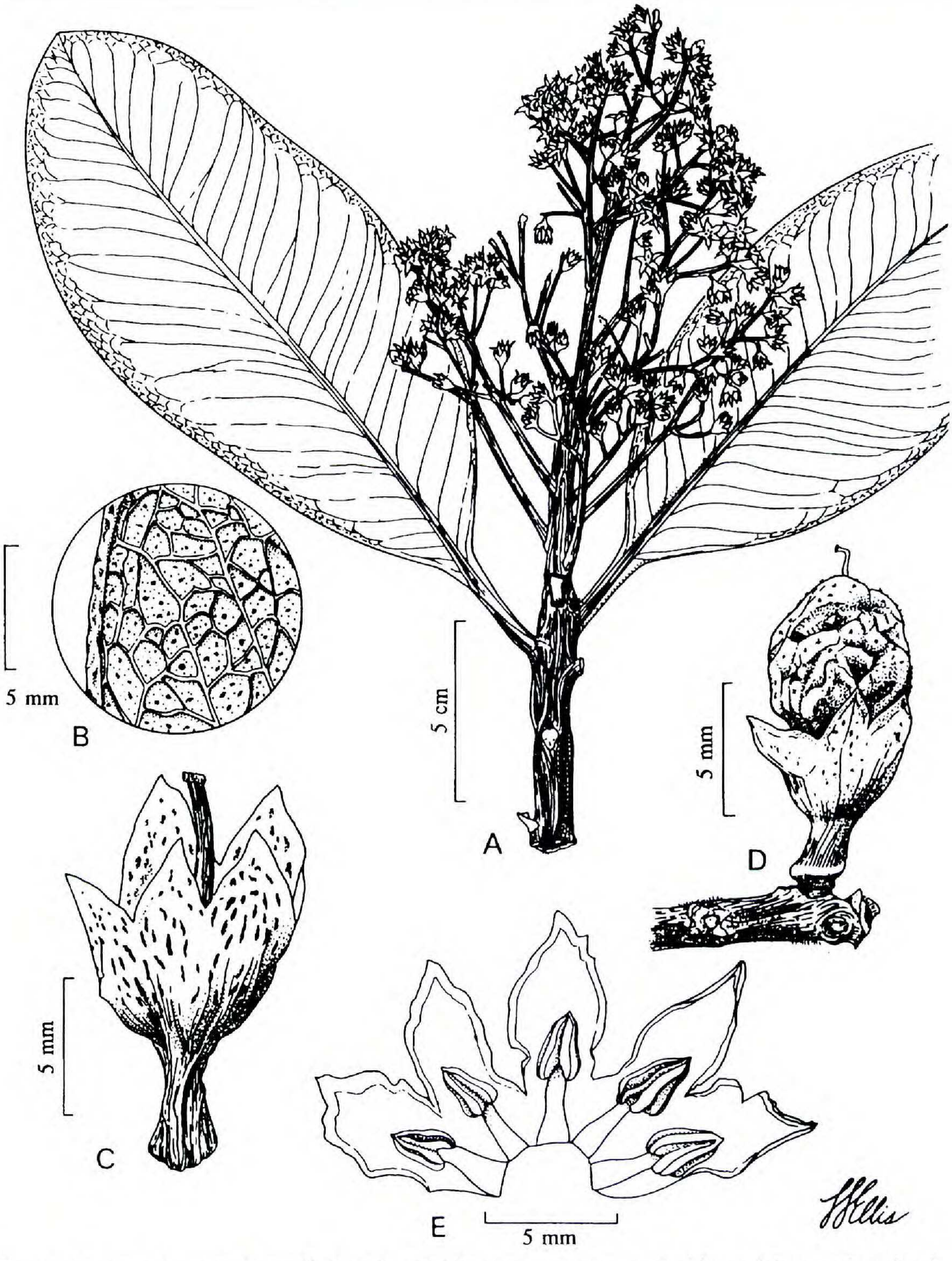

FIG. 1. *Geissanthus vanderwerffii* Pipoly. Habit, showing the angled branchlets and pedicellate flowers. B. Abaxial leaf surface detail, showing the dense and minute pellucid punctations. C. Flower with corolla removed, showing the pedicel, and the cupuliform calyx with entire lobes. D. Young fruit. E. Opened corolla, showing the apiculate anthers with latrorse slits. A–C, E, drawn from holotype; D, drawn from *vanderwerff 8965*.

subter glabris (nec lepidotis) dense minuteque pellucido-punctatis (nec epunctatis), inflorescentiis polygamis (non bisexualis), pedicelis 3–5.6 mm longis (non obsoletis), flores 7–9 (non 3–5.6) mm longis, calyce cupuliformi (non cotyliformi) in fructo spissescenti (nec in statu eodem reliquo), lobis calycinis ovatis vel deltatis (non suborbicularibus) rufo-papillosis (nec glabris) 2.5–3.5 (nec 1.8–2.2) mm longis secus margines opacis integrisque (nec hyalinis erosisque), lobis corollinis ad apices anguste vel late acutis (non rotundatis), denique antheris ad apicem acutis (non rotundatis) perfacile cognoscenda.

Tree to 6 m tall. *Branchlets* angulate, 4.5–10 mm diam., glabrous. *Leaves* alternate; blades coriaceous, widely oblong to obovate, (9.8–)11–15.5(–18.2) cm long, (4.4–)6–7.2(–8.5) cm wide, apically obtuse, widely rounded or rarely truncate, basally obtuse to truncate, decurrent on the petiole, dull, glabrous, minutely scrobiculate above, densely and minutely pellucid punctate below, the midrib flat to slightly impressed above, prominently raised below, the secondary veins 22–27 pairs, the margin entire, revolute, glabrous; petiole marginate, 1.8–2.5 cm long, glabrous. *Inflorescence* terminal, pyramidal, bipinnately or mixed paniculate, (7.5–)9–12 cm long, 8–15 cm wide at base, polygamous, the flowers staminate and bisexual, monomorphic; peduncle 0.5–1 cm, anglulate, glabrous or very sparsely and minutely rufous papillate, the branches with flowers corymbose; inflorescence, branch and floral bracts apparently early caducous, unknown; pedicels cylindric, 3–5.6 mm long, sparsely pellucid punctate-lineate, glabrous or very sparsely and minutely papillate. *Flowers* chartaceous, white, 7–9 mm long; calyx deeply cupuliform, 5.5–7 mm long, 3–6 lobed, irregularly divided, the tube 2.8–4.9 mm long, sparsely rufous papillate, pellucid or orange punctate and punctate-lineate, the lobes widely ovate to deltate, 2.5–3.5 mm long, 2.1–3.5 mm wide, apically narrowly to broadly acute, the margin entire, opaque, glabrous; fruiting calyx incrassate obconic, 6.6–6.5 mm long, 6–6.3 mm diam.; corolla campanulate, 7–9 mm long, 5-lobed, the tube 3.5–4.2 mm long, the lobes, ovate, 3.5–4.8 mm long, 2.8–3.5 mm wide, apically acute, reflexed 180° at maturity, densely and prominently orange or pellucid punctate, glabrous, the margin entire, slightly involute, glabrous; stamens 5 in staminate flowers, 7.5–8 mm long, the filaments free, 6–6.5 mm long, subterete, the anthers ovate, 1.8–2.5 mm long, 0.9–1.4 mm wide, apically obtuse with prominent apiculum, basally deeply cordate, dehiscent by wide latrorse longitudinal slits, the connective epunctate; stamens of bisexual flowers like those of staminate but 4.2–4.5 mm long, the filaments free, 2.1–2.4 mm long, widened basally 1–1.2 mm, flat, adnate 0.8–1 mm above corolla tube basae, translucent, epunctate, glabrous, the anthers 2.1–2.4 mm long, 1.4 –1.7 mm wide; pistil of bisexual flowers obnapiform, 5.3–5.8 mm long, the ovary 2.6–3 mm long, 3–3.5 mm diam., densely pellucid punctate, glabrous, the placenta depressed-globose, the ovules 3–5, uniseriate; the style 2.5–

2.7 mm long, pellucid punctate-lineate, glabrous, the stigma capitate, 4-lobed; pistillode similar to pistil but 3.5–4 mm long, the ovary 1.2–1.5 mm long, the ovules obsolete, the style 2.3–2.9 mm long, the stigma capitate, unlobed. *Fruit* globose, 6–8 mm diam., inconspicuously pellucid punctate.

TYPE: ECUADOR. ZAMORA CHINCHIPE: along old trail from Nudo de Sabanilla to Vallodolid, 2,300 m, 6 May 1987 (bisexual fl), *H. van der Werff & W. Palacios 9374* (HOLOTYPE: US; ISOTYPES: BRIT, MO, QCNE).

PARATYPES: ECUADOR. ZAMORA-CHINCHIPE: Canton Zamora; Parque Nacional Podocarpus, near el Tambo, 40 km NW of Zamora on road to Loja, 03°58'S, 79°07'W, 2,210 m, 13 July 1993 (fr), *A. Gentry 79920* (MO, QCNE); Yangana-Valladolid Rd., km 21, 04°28'S, 79°09'W, 2.650–2,750 m, 2 Dec 1988 (stam. fl), *J. Madsen, C. Bloch & H. Christensen 75794* (AAU, BRIT, QCA).

Distribution.—Endemic to the south-central Andes of Ecuador, in open elfin forest or scrub, at 2,200–2,750 m elevation.

Ecology and conservation status.—*Geissanthus vanderwerffii* forms a conspicuous element of the cloud forest vegetation, even though it is a component of the understory (van der Werff, pers. comm.). Because sizeable populations of this species occur in a national park located in a somewhat remote area, it is not currently under threat.

Etymology.—It is with great pleasure that I dedicate this spectacular new species to Henk van der Werff, head of the Taxonomy Department at the Missouri Botanical Garden. Henk is a prodigious, indefatigable field worker and pre-eminent authority on the systematics of Neotropical Lauraceae.

The angled branchlets, alternate leaves with entire blades, marginate petioles, the inflorescence equalling or subequalling the leaf length, and the campanulate corolla indicate that *Geissanthus vanderwerffii* is most closely related to *Geissanthus ecuadorensis* Mez. However, the coriaceious leaf blades scrobiculate above, densely and minutely pellucid punctate and glabrous below, the polygamous inflorescence with longer pedicels and larger flowers, the cupuliform calyx incrassate in fruit, and with ovate to deltate, rufous-papillate lobes that are entire and opaque along the margins permit easy recognition of *G. vanderwerffii.* In addition, the narrowly to widely acute corolla lobe apices are distinctive. The incrassate (thickening with maturity) fruiting calyx is unique within the genus.

Geissanthus spectabilis Pipoly, sp. nov. (Fig. 2)

Propter ramulos ad apices angulatos furfuraceo-lepidotos, folia pseudoverticillata, lamina chartacea anguste vel late oblanceolata ad apices acuminata, secus margines integerrima plana, glabraque, petiolos canaliculatos desuper glabros subter furfuraceo-lepidotos, inflorescentia terminalia pyramidalia, flores membranaceos, lobos calycinos ad apices acutos secus margines integros glabrosque, corolla campanulata, necnon lobos corollinos lineares *G. longistamineo* valde arcte affinis, sed ab ea ramulis pentangularibus (nec irregulariter angulatis mature teretibus) sine granulis glanduares (nec glandulari-granulosis), laminis

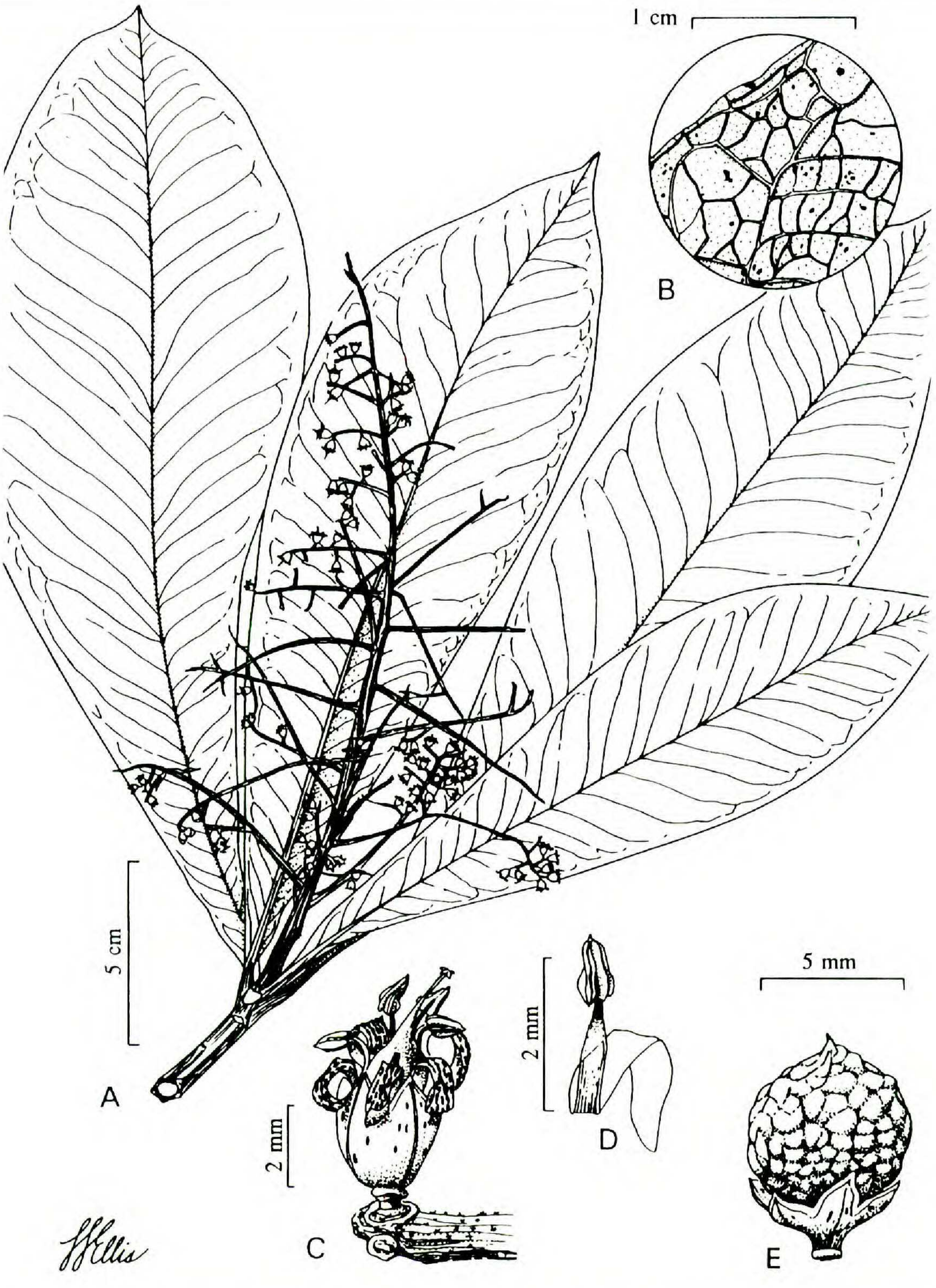

FIG. 2. *Geissanthus spectabilis* Pipoly. A. Habit, showing the angulate branchlets and pseudoverticillate leaves. B. Abaxial leaf surface detail, showing scattered rufous furfuraceous lepidote scales. C. Flower, showing acute calyx lobes and linear corolla lobes. D. Dissected corolla lobe and attached stamen, showing prominent anther apiculum. E. Fruit. A–D, drawn from holotype; E, drawn from *Smith 4172*.

ad bases acutis (non abrupte truncatis) subter obscure pellucido-punctatis punctato-lineatisque (nec manifeste atro punctato-lineatis), panicula tri- (non bi-) pinnata, pedicelis obsoletis (non obconicis 0.2–1.3mm longisque), floribus 3.5–4.5 (non 5.8–6.3) mm longis, filamentis planis (non teretibus), 2–2.3 (nec 4–4.5) mm longisque, antheris parce dorsifixis (non versatilis) lanceolatis (nec oblongis) 1–1.2 (nec 2.2–2.4) mm longis, ad apices apiculatis (nec obtusis) denique pistillo obnapiformi (non obturbinato) statim separabilis.

Tree to 6 m tall. *Branchlets* angulate, 7–20 mm diam., pentagonal in cross section, prominently ridged along the angles, densely and minutely ferrugineous furfuraceous-lepidote, glabrescent. *Leaves* pseudoverticillate; blades chartaceous, narrowly to widely oblanceolate, (22.5–)29.4–36.5(–41) cm long, (7.5–)8–11.5 cm wide, apically short acuminate, the acumen 1–2 cm long, basally acute, decurrent on the petiole, drying dull and smooth above, pallid, inconspicuously pellucid punctate and punctate-lineate as well as sparsely ferrugineous furfuraceous-lepidote below, the midrib impressed above, prominently raised below, the secondary veins 20–31 pairs, the margin entire, flat, glabrous; petiole canaliculate with a slight margin from decurrent leaf base, 1–1.5 cm long, glabrous above, sparsely furfuraceous-lepidote below. *Inflorescence* terminal, pyramidal tripinnately paniculate, (20–)24–38(–44.5) cm long, (13–)24–33 cm wide at basally, entirely bisexual; peduncle 0.5–1 cm long, the rachis angulate, densely and minutely furfuraceous-lepidote, glabrescent, the branches spicate; inflorescense, branch and floral bracts apparently early caducous, unknown; pedicels obsolete. *Flowers* membranaceous, 3.5–4.5 mm long; calyx deeply cupuliform, 2.5–3.5 mm long, (3–)4–5-lobed, irregularly divided, tube 1–2.5 mm long, lobes ovate to deltate, 1–1.3 mm long, 0.6–1 mm wide, apically acute, glabrous or sparsely lepidote, densely and prominently black punctate, the margin entire, opaque, glabrous; corolla campanulate, 3.5–4.5 mm long, 5-lobed, the tube 1–1.3 mm long, the lobes reflexed 180° at maturity, linear, 2.5–3.5 mm long, apically subulate, hyaline, epunctate, glabrous, the margin entire, flat; stamens 2.8–3.3 mm long, the filaments free, flat, epunctate, glabrous, 2–2.3 mm long, adnate to corolla tube 0.8–1 mm, widened at basally, the anthers lanceolate, 1–1.2 mm long, 0.4–0.5 mm wide, apically rounded with a prominent apiculum, basally rounded, slightly dorsifixed, dehiscent by wide latrorse slits, connective epunctate; pistil obnapiform or globose, 1.5–2 mm long, the ovary globose, ca. 1 mm long and diam., densely black punctate and punctate-lineate, style slender, 0.5–1 mm long, the stigma capitate, 4-lobed, placenta globose, ovules uniseriate, 4. *Fruit* globose, black at maturity, 5–7 mm diam. when dried, pellucid or red punctate.

TYPE: PERU. JUNÍN: Prov. Chanchamayo, Fondo Romero, Pampatigre, above Sta. Ana (SE of La Merced), 11°00'S, 75°10'W, 1,500–1,700 m, 7 Mar 1985 (bisex. fl, fr), *B. Stein & C. Todzia 2336* (HOLOTYPE: MO; ISOTYPE: USM).

PARATYPES: PERU. PASCO: Oxapampa Prov., along road between Oxapampa and Villa Rica, Km 7 SE from Miraflores crest, 10°37'S, 75°20'W, 11 Oct 1982 (fr), *R. Foster 9145* (F, MO, US, USM); 5 km SE of Oxapampa, Oswaldo Müller property, 10°36'S, 75°23'W, 1,850 m, 31 Jan 1983 (fl, fr), *D. N. Smith 3166* (MO, US, USM), 25 May 1983 (fr), *D. N. Smith 4172* (MO, US, USM).

Distribution.—*Geissanthus spectabilis* on the eastern slopes of the Peruvian Andes, in the Departments of Pasco and adjacent Junín, 1,500–2,400 m elevation.

Ecology and conservation status.—*Geissanthus spectabilis* grows in tall "ceja de selva" forest, the cloud forest region of Andean Peru that faces Amazonia. The region is known for its high endemism (Gentry 1993) and contains approximately 57% of the total vascular plant species known for the country. *Geissanthus spectabilis* is a conspicuous element of the forest, although locally common. The late D. Smith indicated (Smith, pers. comm.) that this tree is common at the junction of the taller "ceja" with that of the shorter portion, especially at the margin of the forest along watercourses in small ravines. Given the restricted distribution it is probable that this species is threatened.

Etymology.—The specific epithet describes the aesthetically appealing aspect of the plant.

Geissanthus spectabilis is closely related to *G. longistamineus* (A. C. Smith) Pipoly by virtue of its angulate, furfuraceous lepidote branchlets, pseudoverticillate, chartaceous, narrowly to widely oblanceolate leaves with acuminate apices and entire, flat margins, the terminal and pyramidal inflorescences, the chartaceous flowers with calyx lobes acute, entire and glabrous along the margin, and finally, the corolla campanulate with linear lobes. However, *Geissanthus spectabilis* may immediately be separated by its 5-angled stems, leaf blades with acute bases, obscurely pellucid punctate and punctate-lineate below, the tripinnate panicles, shorter, sessile flowers with flat, shorter filaments, the shorter anthers slightly dorsifixed, lanceolate, and apiculate, and finally the obnapiform pistil.

Geissanthus challuayacus Pipoly, sp. nov. (Fig. 3)

Species haec ob lamina chartacea subter rufo-furfuraceo-lepidota, inflorescentia bisexuales, flores membranaceos, corolla campanulata, anthera lanceolata, *G. francoam* affinis, sed ab ea ramulis aliquantum teretibus (non quadrangularis) glabris (non furfuraceo-lepidotis), laminis secus margines integris (nec serratis), subter squamis lepidotis dissite praeditis (non superpositus sic a velvetem similis) indutis, petiolis 1.7–2.5 (non (2.2–)2.5–3) cm longis, corolla 4–4.5 (non 3–3.2) mm longis, lobis corollinis oblongis (nec linearis), staminibus 4–4.2 (non 2.1–2.2) mm longis, denique stigmate 4-lobato (nec puntiforme) praeclare dignoscenda.

Tree to 10 m tall. *Branchlets* somewhat angular, almost terete, 5–9 mm diam., glabrous. *Leaves* alternate; leaf blades chartaceous, oblanceolate,

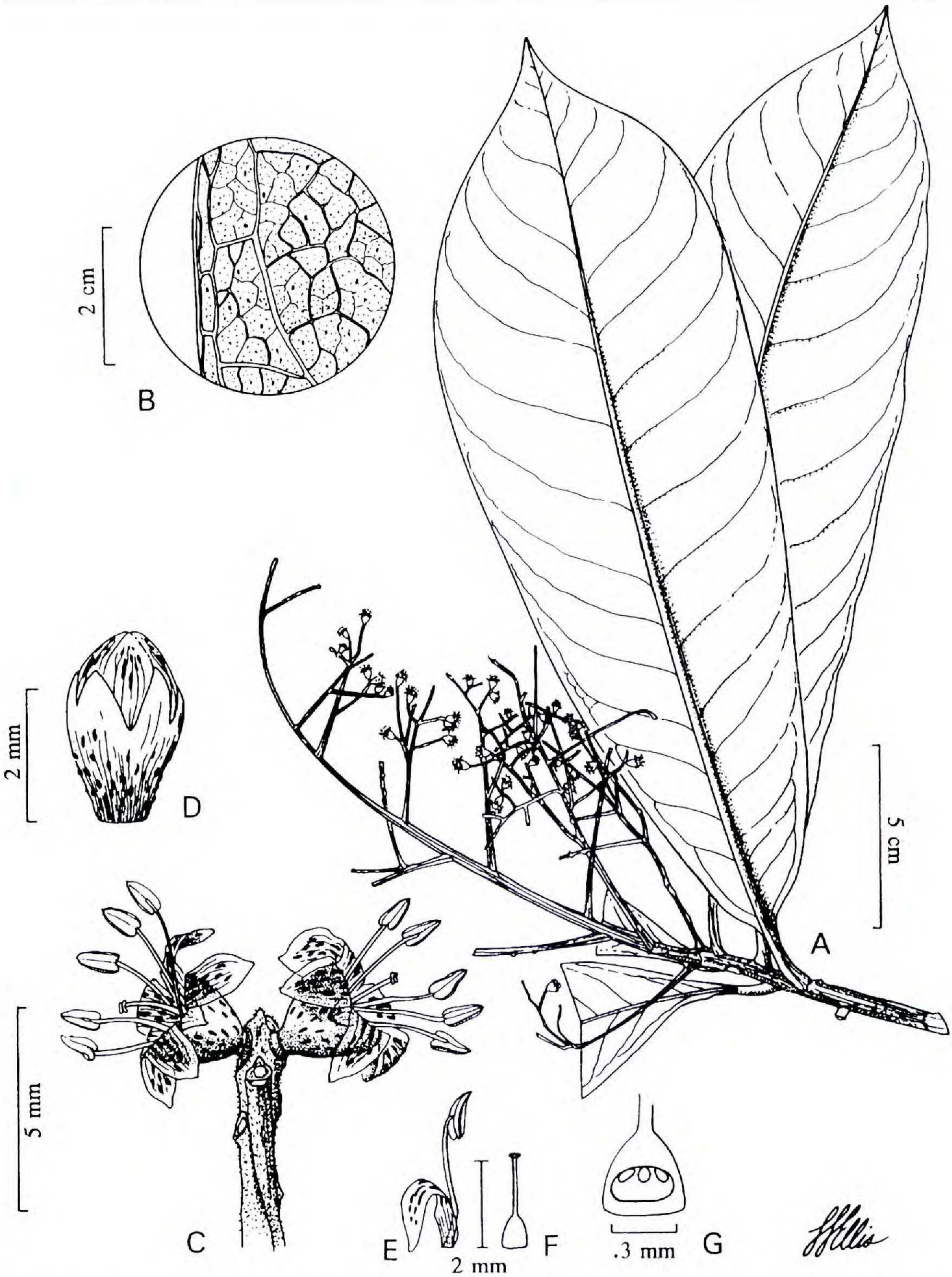

FIG. 3. *Geissanthus challuayacus* Pipoly. A. Habit, showing the almost terete branchlets. B. Abaxial leaf surface detail, showing sparse and minute lepidote scales. C. Inflorescence branchlet tip, showing obsolete pedicels. D. Partially opened flower bud, showing asymmetric rupturing of calyx. E. Dissected corolla lobe and stamen, showing flat filament adnate to corolla lobe. F. Pistil, showing capitate, lobed stigma. G. Longitudinal section of ovary, showing placenta and ovules. A, drawn from *Hurtado 1787*; B–G, drawn from holotype.

(16.8–)22–28 cm long, (4.7–)7–9(–11.8) cm wide, apically cuspidate-acuminate, the acumen 1–1.5 cm long, basally obtuse or rarely acute, decurrent on the petiole, dull and glabrous above, pallid and very sparsely and minutely rufous furfuraceous lepidote below, the midrib canaliculate above, prominently raised below, the secondary veins 16–26 pairs, essentially flat above, slightly raised below, margin entire, flat; petiole marginate, 1.7–2.5 cm long, glabrous. *Inflorescence* terminal, pyramidal bipinnately paniculate, 11.5–20 cm long, 12–28 cm wide at basally, bisexual, the branches spicate; peduncle subsessile, 3–5 mm long, glabrous; inflorescence, branch and floral bracts apparently early caducous, unknown; pedicels obsolete. *Flowers* membranaceous, greenish-white, 4–4.5 mm long; calyx deeply cupuliform, 3.2–3.5 mm long, hyaline,3–5-lobed, irregularly divided, the tube 1.8–2.5 mm long, angular, the lobes ovate, 1.4–1.6 mm long, 1.2–1.4 mm wide, apically acute, densely and prominently black punctate and punctate-lineate, the margin irregular, entire, glabrous; corolla campanulate, 4–4.5 mm long,4–5-lobed, hyaline, regularly divided but highly variable, the tube 1.2–2.5 mm long, the lobes oblong, 2–3 mm long, 1–1.2 mm wide, apically narrowly acute to subacuminate, cucullate, densely black punctate and punctate-lineate apically, the margin regular, entire, glabrous; stamens 4–4.2 mm long; the filaments free, flat, 2.5–3 mm long, hyaline, adnate to corolla tube 0.5 mm from base, the anthers lanceolate, 1.3–1.5 mm long, 0.3–0.5 mm wide, apically acute, at times with a minute apiculum, basally deeply cordate, dorsifixed ca. 1/3 from base, dehiscent by wide latrorse slits, the connective epunctate; pistil obturbinate, 2.2–3 mm long, 0.7–1 mm diam., the ovary globose, 1 mm long, pellucid punctate, glabrous, 1–1.2 mm long, the placenta subglobose, the ovules 4, uniseriate, exposed, the style truncate, 1.5–2 mm long, the stigma capitate, 4-lobed. *Fruit* subglobose, 5–7 mm diam., glabrous, pellucid punctate.

TYPE: ECUADOR. NAPO: Cantón Archidona; S slopes of Volcán Sumaco, Hollín-Loreto Rd, Km 131, Challua Yacu Village, 00°43'S, 77°40'W, 1,200 m, 20–25 Mar 1989 (bisex. fl), *W. Palacios 4066* (HOLOTYPE, BRIT; ISOTYPES, MO, QCNE, US).

PARATYPES. ECUADOR. NAPO: Cantón Archidona; S slopes of Volcán Sumaco, Hollín-Loreto Rd, Km 25, Challua Yacu Center, 00°43'S, 77°40'W, 1,230 m, 10–19 Nov 1989 (fr), *F. Hurtado & A. Alarado 891* (MO, QCNE); 00°43'S, 77°36'W, 1,200 m, 20 Mar 1989 (fl), *F. Hurtado & X. Ruíz 1787* (QCNE, MO, US); Hollín-Loreto Rd, 5 km W of Guamaní, slopes of Volcán Sumaco, 00°43°S, 77°38'W, 1,200 m, 6–7 Sep 1988 (fr), *D. Neill et al. 8574* (MO, QCNE, US).

Distribution.—Thus far, known only from the Volcán Sumaco area, along the Hollin-Loreto Rd., Province of Napo, Ecuador, from 1,200–1,230 m elevation.

Ecology and conservation status.—*Geissanthus challuayacuus* grows in lower

montane forest, on the eastern slopes of the Andes, facing Amazonia. It is presumed that, given the forest destruction present in the Napo region of Ecuador, this species may be considered threatened.

Etymology.—The specific epithet is the genitive form of the village name, Challua Yacu, Napo, Ecuador, and is thus declined as a Latin noun of the Fourth Declension.

The chartaceous leaves, furfuraceous lepidote below, bisexual inflorescences, membranous flowers with campanulate corollas and lanceolate anthers indicate that *Geissanthus challuayacuus* is most closely related to *G. francoae* Pipoly, but may be separated by the somewhat terete, glabrous branchlets, leaf blades with entire margins, sparsely lepidote undersurface, shorter petioles, longer corolla with oblong lobes, longer stamens, and 4-lobed stigma.

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